

CLAIMS

1. A method for operating a wireless communications device, comprising operations of:

responsive to wakeup from a reduced power sleep state, performing operations comprising: detecting signal quality of one or more prescribed signals received by the wireless communications device, receiving signals including (1) scheduled network transmission of a call-paging message and (2) a first number of at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each scheduled transmission of the call-paging message, where the first number varies inversely with the detected signal quality;

where call-paging message content indicates whether the network has received an incoming call for the device, and broadcast-paging message content indicates whether the network has announced availability of on-demand broadcast content.

2. The method of claim 1, the operations further comprising:

prior to re-entering the sleep state, computing a next wakeup time in order to minimize a total time of receiving the call-paging message and a second number of at least one instance of the broadcast-paging message, and configuring the wireless device to wake at the computed next wakeup time.

3. The method of claim 2, where:

the operations further comprise the wireless device obtaining information including: a time of network transmission of the next call-paging message, and a schedule for network transmission of the repeating broadcast-paging message;

performance of the computing operation utilizes data including the obtained information.

4. The method of claim 2, the operation of computing the next wakeup time comprising:

planning an order of receiving the call-paging message and the broadcast-paging messages to minimize the total time.

5. The method of claim 2, the operation of computing the next wakeup time comprising:

if the second number is greater than one, planning the next wakeup time to receive at least one broadcast-paging message before the next call-paging message.

6. The method of claim 2, the operation of computing the next wakeup time further comprising:

re-detecting signal quality of one or more prescribed signals received by the wireless communications device;

where the second number varies inversely with the re-detected signal quality.

7. The method of claim 2, where the second number varies inversely with the detected signal quality.

8. The method of claim 1, the operations further comprising:

planning the first number in regard to a next wakeup, and storing a machine-readable representation of the first number for future retrieval and use by the wireless communications device responsive to the next wakeup.

9. The method of claim 1, where the operation of receiving signals comprises:

evaluating the signal quality per a predetermined criteria;

establishing the first number according to results of the evaluation.

10. The method of claim 1, the operations further comprising:

the wireless communications device re-entering the sleep state substantially immediately after receipt of the call-paging message and the first number of instances of the broadcast-paging message.

11. A method of operating a wireless communications device, comprising operations of:

responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message, receiving at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message;

prior to re-entering the sleep state, establishing a next wakeup time so as to minimize a total time of receiving the call-paging message and at least one instance of the broadcast-paging message.

12. A method of operating a wireless communications device, comprising operations of:

responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message and one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message, evaluating signal metrics of one or more prescribed signals received at the wireless communications device, and receiving as many additional instances of the broadcast-paging message as dictated by results of the signal metrics evaluation.

13. At least one signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital data processor to perform operations to manage a wireless communications device, the operations comprising:

responsive to wakeup from a reduced power sleep state, performing operations comprising: detecting signal quality of one or more prescribed signals received by the wireless communications device, receiving signals including (1) scheduled network transmission of a call-paging message and (2) a first number of at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each scheduled transmission of the call-paging message, where the first number varies inversely with the detected signal quality;

where call-paging message content indicates whether the network has received an incoming call for the device, and broadcast-paging message content

indicates whether the network has announced availability of on-demand broadcast content.

14. The medium of claim 13, the operations further comprising:
prior to re-entering the sleep state, computing a next wakeup time in order to minimize a total time of receiving the call-paging message and a second number of at least one instance of the broadcast-paging message, and configuring the wireless communications device to wake at the computed next wakeup time.

15. The medium of claim 14, where:
the operations further comprise the wireless device obtaining information including: a time of network transmission of the next call-paging message, and a schedule for network transmission of the repeating broadcast-paging message;
performance of the computing operation utilizes data including the obtained information.

16. The medium of claim 14, the operation of computing the next wakeup time comprising:
planning an order of receiving the call-paging message and the broadcast-paging messages to minimize the total time.

17. The medium of claim 14, the operation of computing the next wakeup time comprising:
if the second number is greater than one, planning the next wakeup time to receive at least one broadcast-paging message before the next call-paging message.

18. The medium of claim 14, the operation of computing the next wakeup time further comprising:
re-detecting signal quality of one or more prescribed signals received by the wireless communications device;
where the second number varies inversely with the re-detected signal quality.

19. The medium of claim 14, where the second number varies inversely with the detected signal quality.

20. The medium of claim 13, the operations further comprising:
planning the first number in regard to a next wakeup, and storing a machine-readable representation of the first number for future retrieval and use by the wireless communications device responsive to the next wakeup.

21. The medium of claim 13, where the operation of receiving signals comprises:

evaluating the signal quality per a predetermined criteria;
establishing the first number according to results of the evaluation.

22. The medium of claim 13, the operations further comprising:
the wireless communications device re-entering the sleep state substantially immediately after receipt of the call-paging message and the first number of instances of the broadcast-paging message.

23. At least one signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital data processor to perform operations to manage a wireless communications device, the operations comprising:

responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message, receiving at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message;

prior to re-entering the sleep state, establishing a next wakeup time so as to minimize a total time of receiving the call-paging message and at least one instance of the broadcast-paging message.

24. At least one signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital data processor to perform operations to manage a wireless communications device, the operations comprising:

responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message and one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message, evaluating signal metrics of one or more prescribed signals received at the wireless communications device, and receiving as many additional instances of the broadcast-paging message as dictated by results of the signal metrics evaluation.

25. Circuitry including multiple interconnected electrically conductive elements configured to perform operations to manage a wireless communications device, the operations comprising:

responsive to wakeup from a reduced power sleep state, performing operations comprising: detecting signal quality of one or more prescribed signals received by the wireless communications device, receiving signals including (1) scheduled network transmission of a call-paging message and (2) a first number of at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each scheduled transmission of the call-paging message, where the first number varies inversely with the detected signal quality;

where call-paging message content indicates whether the network has received an incoming call for the device, and broadcast-paging message content indicates whether the network has announced availability of on-demand broadcast content.

26. The circuitry of claim 25, the operations further comprising:

prior to re-entering the sleep state, computing a next wakeup time in order to minimize a total time of receiving the call-paging message and a second number of at least one instance of the broadcast-paging message, and configuring the wireless communications device to wake at the computed next wakeup time.

27. The circuitry of claim 26, where:
the operations further comprise the wireless device obtaining information including: a time of network transmission of the next call-paging message, and a schedule for network transmission of the repeating broadcast-paging message;
performance of the computing operation utilizes data including the obtained information.

28. The circuitry of claim 26, the operation of computing the next wakeup time comprising:
planning an order of receiving the call-paging message and the broadcast-paging messages to minimize the total time.

29. The circuitry of claim 26, the operation of computing the next wakeup time comprising:
if the second number is greater than one, planning the next wakeup time to receive at least one broadcast-paging message before the next call-paging message.

30. The circuitry of claim 26, the operation of computing the next wakeup time further comprising:
re-detecting signal quality of one or more prescribed signals received by the wireless communications device;
where the second number varies inversely with the re-detected signal quality.

31. The circuitry of claim 26, where the second number varies inversely with the detected signal quality.

32. The circuitry of claim 25, the operations further comprising:
planning the first number in regard to a next wakeup, and storing a machine-readable representation of the first number for future retrieval and use by the wireless communications device responsive to the next wakeup.

33. The circuitry of claim 25, where the operation of receiving signals comprises:

evaluating the signal quality per a predetermined criteria;
establishing the first number according to results of the evaluation.

34. The circuitry of claim 25, the operations further comprising:
the wireless communications device re-entering the sleep state substantially immediately after receipt of the call-paging message and the first number of instances of the broadcast-paging message.

35. Circuitry including multiple interconnected electrically conductive elements configured to perform operations to manage a wireless communications device, the operations comprising:

responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message, receiving at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message;

prior to re-entering the sleep state, establishing a next wakeup time so as to minimize a total time of receiving the call-paging message and at least one instance of the broadcast-paging message.

36. Circuitry including multiple interconnected electrically conductive elements configured to perform operations to manage a wireless communications device, the operations comprising:

responsive to wakeup from a reduced power sleep state, performing operations comprising:

receiving a network transmitted call-paging message and one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message, evaluating signal metrics of one or more prescribed signals received at the wireless communications device, and receiving as many additional instances of the broadcast-paging message as dictated by results of the signal metrics evaluation.

37. A wireless communications device, comprising:

- a transceiver;
- a speaker;
- a microphone;
- a user interface;
- a manager, coupled to the transceiver, speaker, microphone, and user interface, and programmed to perform operations comprising:
 - responsive to wakeup from a reduced power sleep state, performing operations comprising:
 - detecting signal quality of one or more prescribed signals received by the wireless communications device, receiving signals including (1) scheduled network transmission of a call-paging message and (2) a first number of at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each scheduled transmission of the call-paging message, where the first number varies inversely with the detected signal quality;
 - where call-paging message content indicates whether the network has received an incoming call for the device, and broadcast-paging message content indicates whether the network has announced availability of on-demand broadcast content.

38. A wireless communications device, comprising:

- a transceiver;
- a speaker;
- a microphone;
- a user interface;
- a manager, coupled to the transceiver, speaker, microphone, and user interface, and programmed to perform operations comprising:
 - responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message, receiving at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message;

prior to re-entering the sleep state, establishing a next wakeup time so as to minimize a total time of receiving the call-paging message and at least one instance of the broadcast-paging message.

39. A wireless communications device, comprising:
a transceiver;
a speaker;
a microphone;
a user interface;
a manager, coupled to the transceiver, speaker, microphone, and user interface, and programmed to perform operations comprising:
responsive to wakeup from a reduced power sleep state, performing operations comprising:
receiving a network transmitted call-paging message and one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message, evaluating signal metrics of one or more prescribed signals received at the wireless communications device, and receiving as many additional instances of the broadcast-paging message as dictated by results of the signal metrics evaluation.

40. A wireless communications device, comprising:
means for transceiving;
speaker means for producing an audible signal from an electrical signal;
microphone means for producing an electrical signal from an audible signal;
user interface means for exchanging information with an operator;
manager means for performing operations comprising:
responsive to wakeup from a reduced power sleep state, performing operations comprising:
detecting signal quality of one or more prescribed signals received by the wireless communications device, receiving signals including (1) scheduled network transmission of a call-paging message and (2) a first number of at least one instance of a repeating network transmitted broadcast-paging message that

occurs multiple times for each scheduled transmission of the call-paging message, where the first number varies inversely with the detected signal quality;

where call-paging message content indicates whether the network has received an incoming call for the device, and broadcast-paging message content indicates whether the network has announced availability of on-demand broadcast content.

41. A wireless communications device, comprising:
means for transceiving;
speaker means for producing an audible signal from an electrical signal;
microphone means for producing an electrical signal from an audible signal;
user interface means for exchanging information with an operator;
manager means for performing operations comprising:
responsive to wakeup from a reduced power sleep state, performing operations comprising:
receiving a network transmitted call-paging message, receiving at least one instance of a repeating network transmitted broadcast-paging message that occurs multiple times for each instance of the call-paging message;
prior to re-entering the sleep state, establishing a next wakeup time so as to minimize a total time of receiving the call-paging message and at least one instance of the broadcast-paging message.

42. A wireless communications device, comprising:
means for transceiving;
speaker means for producing an audible signal from an electrical signal;
microphone means for producing an electrical signal from an audible signal;
user interface means for exchanging information with an operator;
manager means for performing operations comprising:
responsive to wakeup from a reduced power sleep state, performing operations comprising: receiving a network transmitted call-paging message and one instance of a repeating network transmitted broadcast-paging message that occurs

multiple times for each instance of the call-paging message, evaluating signal metrics of one or more prescribed signals received at the wireless communications device, and receiving as many additional instances of the broadcast-paging message as dictated by results of the signal metrics evaluation.

43. A method for communicating paging messages to wireless communications devices of a wireless communications network, where the network responds to each incoming call placed to a wireless communications device by transmitting a call-paging message within a corresponding partition of a digital radio frame of prescribed format, the method comprising operations of:

responsive to each occurrence of a specified broadcast event, transmitting a repeating broadcast-paging message announcing the availability of broadcast content from the network, where the broadcast-paging message is transmitted multiple times within each digital radio frame.

44. The method of claim 43, where:

the transmitting operation comprises: responsive to each occurrence of a first broadcast event associated with first set of one or more broadcast programs, transmitting a first repeating broadcast-paging message announcing the availability of broadcast content related to the first set of broadcast programs, where the broadcast-paging message is transmitted multiple times within each digital radio frame;

the operations further comprise: responsive to each occurrence of a second broadcast event associated with second set of one or more broadcast programs, transmitting a second repeating broadcast-paging message announcing the availability of broadcast content related to the second set of broadcast programs, where the broadcast-paging message is transmitted multiple times within each digital radio frame.

45. The method of claim 43, where:

the broadcast-paging message comprises a binary signal indicating whether or not broadcast content is available from the network.

46. The method of claim 43, where one type of broadcast event comprises base station receipt of network-assigned instructions to notify wireless communication devices of one or more particular broadcast programs.

47. The method of claim 43, where one type of broadcast event comprises the base station upon querying the network learning that one or more unannounced broadcast programs are available from the network.

48. The method of claim 43, where one type of broadcast event comprises the base station upon querying the network learning that the network has designated one or more previously announced broadcast programs for re-announcement.

49. At least one signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital data processor to perform operations for communicating paging messages to wireless communications devices of a wireless communications network, where the network responds to each incoming call placed to a wireless communications device by transmitting a call-paging message within a corresponding partition of a digital radio frame of prescribed format, the method comprising operations of:

responsive to each occurrence of a broadcast event, transmitting a repeating broadcast-paging message announcing the availability of broadcast content from the network, where the broadcast-paging message is transmitted multiple times within each digital radio frame.

50. Circuitry including multiple interconnected electrically conductive elements configured to perform operations for communicating paging messages to wireless communications devices of a wireless communications network, where the network responds to each incoming call placed to a wireless communications device by transmitting a call-paging message within a corresponding partition of a digital radio frame of prescribed format, the method comprising operations of:

responsive to each occurrence of a broadcast event, transmitting a repeating broadcast-paging message announcing the availability of broadcast content

from the network, where the broadcast-paging message is transmitted multiple times within each digital radio frame.

51. A base station apparatus for use in a wireless communications network that responds to each incoming call placed to a wireless communications device by transmitting a call-paging message within a corresponding partition of a digital radio frame of prescribed format, the base station comprising:

one or more antennas;

a transceiver;

a digital data processor programmed to communicate paging messages to wireless communications devices by performing operations comprising: responsive to each occurrence of a broadcast event, transmitting a repeating broadcast-paging message announcing the availability of broadcast content from the network, where the broadcast-paging message is transmitted multiple times within each digital radio frame.

52. A base station apparatus for use in a wireless communications network that responds to each incoming call placed to a wireless communications device by transmitting a call-paging message within a corresponding partition of a digital radio frame of prescribed format, the base station comprising:

antenna means for relaying signals between conductive media and air media;

means for transceiving;

digital data processor means for communicating paging messages to wireless communications devices by performing operations comprising: responsive to each occurrence of a broadcast event, transmitting a repeating broadcast-paging message announcing the availability of broadcast content from the network, where the broadcast-paging message is transmitted multiple times within each digital radio frame.

53. A wireless communications network that responds to each incoming call placed to a wireless communications device by transmitting a call-paging message within a corresponding partition of a digital radio frame of prescribed format, the network comprising:

multiple base stations;

wireless communications network equipment shared by multiple base stations;

where at least one of the base stations and network facilities is programmed to communicate paging messages to wireless communications devices by performing operations comprising: responsive to each occurrence of a broadcast event, transmitting a repeating broadcast-paging message announcing the availability of broadcast content from the network, where the broadcast-paging message is transmitted multiple times within each digital radio frame.